REMARKS

Claims 1, 3-5, 7-14, 17, 20, and 21-41 are pending in this application. Claims 1, 2, 21, 22, 31, and 32 are amended herein. Claim 41 is new. Claims 1, 21, 31, and 41 are the independent claims.

Rejections Under 35 U.S.C. § 103(a)

The Examiner rejected claims 1, 3, 9-11, 13, 17, 20-22, 27-32, 37, 38, and 40 under 35 USC § 103(a) as unpatentable over prior art patent BE 1011263 and a technical note by Zeisler et al. The Examiner argues that BE 1011263 discloses a two-part insert, but does not teach a different material for one of the insert parts, and that Zeisler teaches a different material for the target chamber (i.e. niobium).

The Examiner rejected claims 4, 5, 7, 8, 12, 23-26, 30, and 33-36 as unpatentable over the above references in further view of U.S. 5,917,874 to Schlyer, which discloses coupling by bolts. Claims 14 and 39 are rejected as unpatentable over the above BE 1011263 patent and the Zeisler technical note in further view of U.S. 2005/0201504 to Zeisler, which discloses the use of stainless steel.

The Applicant wishes to thank the Examiner for withdrawing the previous rejection. However, the new rejection, which relies on a combination of prior art patent BE 1011263 and a technical note by Zeisler et al., does not establish a prima facie case of obviousness of the pending claims, and therefore Applicant requests that the pending rejections of claims be similarly withdrawn.

The Problem And Applicant's Solution

As explained in the Background section of the present application, the choice of insert material in irradiation cell target chambers is particularly important. It is necessary to avoid the production of radioisotopes that disintegrate by high-energy gamma particle emission and make any mechanical intervention on the target difficult

due to radiosafety problems. In addition, thermal conductivity and machinability are also important parameters for the insert material, particularly where the insert is of a complex structure.

Prior art inserts for target cell chambers are not made of materials that offer desired chemical inertness, thermal conductivity, and machinability. In addition, prior art inserts cannot be produced with an elongated cavity long enough to provide a desirably large surface for thermal exchange.

The claims of the present application recite an irradiation cell that has a removable insert comprising two insert parts, each of the insert parts being made of different materials. This two-part insert design allows for inserts with longer cavities and improved heat exchange, while allowing the insert to be as chemically inert as possible. These advantages are not possible with an insert made of only one material.

Prior Art Patent BE 1011263 Discloses Only A One-Piece Insert, Not A Two-Piece Insert As Argued By The Examiner

BE 1011263 (BE '263) discloses a one-piece insert made of solid silver or titanium. (p. 4). Furthermore, replacing the one-piece insert of the prior art with a two-part insert comprised of two different materials would not be obvious as argued by the examiner. The claimed two-part insert unexpectedly allows the cavity of the insert to be significantly longer than in the prior art, increasing efficiency and heat exchange properties. This is not simply a case of replacing a one-piece device with a two-piece device having identical properties, and therefore the reasons for obviousness argued by the Examiner do not apply in this instance.

The advantages of the device claimed in the present application over this prior art disclosure are discussed at paragraph 0039 of this application. Using the one-piece insert of the prior art, the cavity for the target material is necessarily shorter, and the

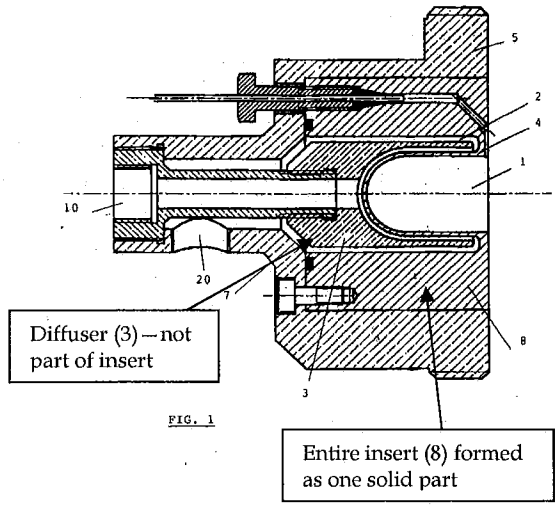
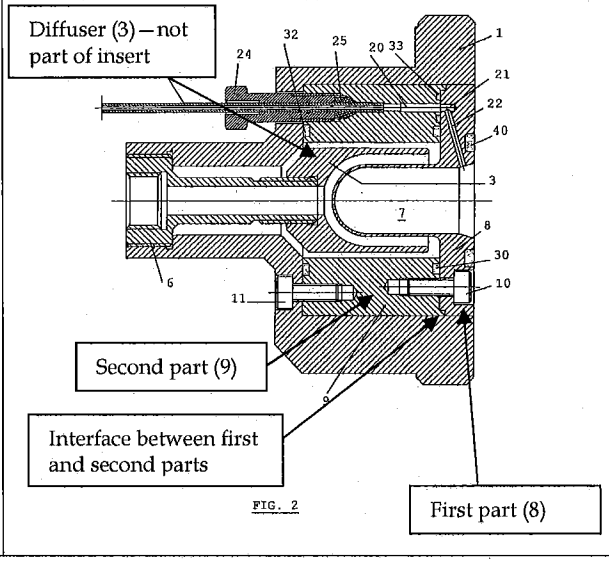
cavity must be filled to maximum. This leads to lower irradiation efficiency and decreased heat exchange.

There was no suggestion prior to the present application that the insert of BE '263 may be made with two distinct parts so that a different material may be used for each part.

In the rejection, the Examiner appears to consider the diffuser (part no. 3 in Fig. 1 of the BE '263 patent) to be the second part of the insert. For instance, the Examiner points to Fig. 1 of the BE '263 patent and argues that "the insert part forming the channel 2 is the second part..." (Office Action p. 3). The channel 2 of the BE '263 reference is formed between a one-piece insert 8 and a diffuser 3. **However, the diffuser is not part of the two-part insert**. The diffuser is intended to provide a path for a cooling medium around the insert, and therefore has a function in the device that is much different than the insert, which houses the target material. Unlike the prior art, the present application shows a diffuser 3 forming a channel between two distinct parts of a two-part insert. (Fig. 2). Claims 1 and 21 have been amended in order to recite a diffuser as well as a two-part insert, clarifying that the diffuser is not one of the two claimed insert parts.

Furthermore, although Examiner also points out that the English translation of that document refers to "insert parts" (plural), there is no suggestion that two insert parts are placed in a single target at the same time. Rather, the term "parts" appears to indicate that one insert may be replaced with another.

It is clear from the drawings that the insert of BE 1011263 is one unitary part, while the invention of the present application has a two-part insert. As illustrated below, the prior art at left shows a solid insert (8) while the device to the right that is shown in the present application has a similarly shaped insert that is divided into to parts (8 and 9).

Prior Art BE 1011263	Present Invention
 FIG. 1	 FIG. 2

The BE '263 reference also refers to the insert 8 as being made "in solid silver or titanium," indicating a unitary insert. (BE '263 p. 4). There is no suggestion whatsoever that the insert may have two parts made of two different materials.

<u>The Zeisler Technical Note Discloses Only A One-Piece Target Chamber Made Of A Single Material (Niobium), And Does Not Suggest Using Two Or More Materials. Therefore, At Most Zeisler Suggests Replacing The Entire Insert Of BE 1011263 With Niobium, Yielding A One-Piece Niobium Insert.</u>

The Examiner combines BE 1011263 with a technical note written by Zeisler et al. ("the Zeisler technical note"), which discusses the use of niobium to construct a target chamber. Even though Zeisler does disclose certain benefits of niobium inserts in target chambers, it does not disclose inserts made of both niobium and another metal such as silver or titanium. The target described is made from two niobium hemispheres and a niobium tube welded together to form a unitary structure. (Zeisler p. 450). The target chamber is shown in Figs. 1 and 2 and is simply referred to as a niobium target chamber. This niobium target chamber is discussed only as a

replacement for silver or titanium target chambers, not as being used in combination with silver or titanium target chamber parts. (Zeisler pp. 449, 450). Therefore, combining the Zeisler article with BE 1011263 would suggest only replacing a one-piece silver or titanium insert with a niobium insert, not a two-part insert made of two different materials.

In addition, the target chamber in the Zeisler technical note is specifically shown and described as spherical, and does not have an elongated cavity that is longer in a direction parallel to the particle beam. Fig. 2 of Zeisler best shows the lack of an elongate cavity in a direction parallel to the particle beam.

The Claims Are Not Obvious-The References Alone Or In Combination Do Not Suggest A Two Piece Insert

As explained above, none of the cited prior art discloses or suggests a two-part insert, let alone a two-part insert made of two different materials. As the present application indicates, silver and titanium have properties that in some respects are more advantageous than those of niobium in the construction of metallic inserts for target chambers. For instance, silver and titanium are easier to machine than niobium or tantalum and have better thermal conductivity. On the other hand, niobium and tantalum have very low chemical reactivity and are therefore beneficial materials for irradiation targets. Without a two-part insert as claimed herein, the cavity for holding the target material cannot have the overall length and heat exchange properties desired while still having the chemical inertness of niobium or tantalum Therefore, the claimed two-part insert has advantages lacking in both the prior art BE 1011263 patent and the Zeisler technical note. None of the prior art suggests a two-part insert with the same advantages.

Conclusion

For the foregoing reasons, it is respectfully requested that claims 1, 3-5, 7-14, 17, 20, and 21-41 be allowed to pass to issue.

The Commissioner is hereby authorized to charge any additional fees which may be required with respect to this communication, or credit any overpayment, to Deposit Account No. 06-1135.

Respectfully submitted,

FITCH, EVEN, TABIN & FLANNERY

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By: /Timothy E. Levstik
Timothy E. Levstik
Registration No. 30,192

120 South LaSalle Street, Suite 1600
Chicago, Illinois 60603-3406
Telephone (312) 577-7000
Facsimile (312) 577-7007
576006